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IN THE SPECIFICATION

[6] On board systems for weighing load also exist. One such system measures the load directly by reading load cells on a bed. Another system measures load indirectly by relating load to air pressure on ~~a the~~ suspension. Such systems provide the driver with a reading of load distribution only. They do not provide information on how load should be distributed.

[8] Moreover, the measurements offered by these foregoing methods of determining load distribution are not integrated or analyzed with other vehicle characteristics that affect vehicle maneuverability and handling, such as tire pressure, axle position, or trailer height. Load distribution is accordingly not optimized for performance.

[15] The inventive information system senses the actual location of the tractor axle. A load distribution is determined electronically across the vehicle. The evaluation unit then determines an alternative location for the axle based on the sensed actual location of the axle and the load distribution across the vehicle. An alternative location of the axle is then displayed on a general user interface. Based on this information, a vehicle driver may adjust the location of the axle ~~(by moving a slider)~~ or adjust the load distribution.

[29] In the present invention, evaluation unit 36 automatically provides the driver with a determination of how load distribution could be optimized for compliance with state and federal

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limits as well as for performance and operational safety of the vehicle. Evaluation unit 36 communicates with load sensors 24A-J and evaluates the signal or information from these sensors with load optimization data stored in a memory unit within evaluation unit 36. Evaluation unit 36 determines tractor axle loads from load sensors 24A and 24F (axle 28A), 24B and 24G (axle 28B), and 24C and 24H (axle 28C), and trailer axle loads from load sensors 24D and 24I (axle 28D) and 24E and 24J (axle 28E). Additionally, loading at the tractor/trailer's kingpin ~~52~~ 28E is determined and analyzed.

[32] As seen in Figure 3, commercially available position sensors measure distances between components of tractor/trailer 20. Position sensors 44A-E and 48 measure axle 28A, B, C, D, E to kingpin distances, for example the distance between 44A (axle) and 48 (kingpin). Position sensors may also monitor the position of suspension member 50 and the distance between the axle and a frame. These distances are adjustable by tractor/trailers, and factor importantly in determining optimal load distribution on tractor 38 and trailer 40. Evaluation unit 36 monitors all of these distances.

[34] Referring to Figure 3, display 52 provides instruction to the operator to optimize load distribution. Display 52 may be a general user interface 56 to allow driver to query or respond to queries of evaluation unit 36. The algorithms to perform these calculations are well within the skill of the worker in the art. Display 52, general user interface 56, and evaluation unit 36 can all be integrated into the cab of the tractor 36, or remote, or even hand-held.

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[35] The invention allows the driver to readily optimize his vehicle for performance and compliance with load limits. For example, a driver loads at a loading dock with a ~~slider trailer 40~~ in the farthest rearward position. After loading, the driver examines display 52 and queries evaluation unit 36 to optimize the tractor/trailer 20 for city driving. Evaluation unit 36 reads signals from load sensors 24A-24J and position sensors 44A-E, 48, and 50. After reading and evaluating these sensors with load optimization data, display 52 then provides the driver with the optimal position of the ~~slider trailer 40~~ for the given load distribution for city driving. Display 52 also warns the driver of any axle overload conditions or state and federal load limit violations. After each delivery of load, the driver can continue to query evaluation unit 36 to configure the tractor/trailer 20 for optimal performance by repositioning load and/or repositioning components.

[37] One particular version of the invention provides information to a vehicle driver on how to adjust a vehicle component of tractor/trailer 20, such as slider 150 so as to maximize performance and improve load distribution. Figure 4 illustrates a close up view of slider 150. As known, a trailer slider carries two tandem axles, axle 28D and axle 28E, mounted to carriage 51. Carriage 51 has pins 66 that fit within holes 62 of rails 53, which are attached to trailer 40. Holes 62 are typically spaced about six inches apart. By removing pins 66 from hole 62, carriage 51 and tandem axles 28D and 28E may be moved along axis X relative to trailer 40 to permit the position of axle 28D and 28E to change. The slider is shown schematically here, as it is simply

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as known in the art. Slider 150 typically allows an adjustment of about 100 inches from L_{min} to L_{max} of carriage 51.

[38] Typically, a driver must guess as to the best position for axles 28D and 28E for given load. However, evaluation unit 36 provides the optimal position for slider 150 so that a driver may receive this information from display 52 and adjust axle 28D and 28E accordingly. In this way, evaluation unit 36 enhances vehicle performance and load distribution.